Aalto University
School of Business

DIVERSIFICATION STRATEGIES' EFFECT ON FIRM PERFORMANCE IN NORDIC COUNTRIES

New evidence on value and profitability effect using common analysts –method for defining peer firms

Master's Thesis
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Finance
Fall 2019

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Title of thesis Diversification Strategies' Effect on Firm Performance in Nordic Countries

Degree Master of Science (Economics and Business Administration)

Degree programme Finance

Thesis advisor(s) Vesa Puttonen

Year of approval 2019 **Number of pages** 57+5 **Language** English

Abstract

I study the effects of different diversification strategies on firm excess value and profitability in Nordics between 2012 and 2018. I challenge the common methods used in prior literature and utilize a novel common analyst – method to define peer firms created by Kaustia and Rantala (2018). My results show that there seems to be a significant diversification discount for related and unrelated diversification strategies in Nordics when compared to focused peer groups simulated by the common analyst -method. I also show that the source for the diversification discount is the worse operational profitability in these diversification strategies compared to the focused peers.

Keywords Diversification strategy, diversification discount, profitability, peer group

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Työn nimi Diversification Strategies' Effect on Firm Performance in Nordic Countries

Tutkinto Kauppatieteiden maisteri

Koulutusohjelma Rahoitus

Työn ohjaaja Vesa Puttonen

Hyväksymisvuosi 2019 **Sivumäärä** 57+5 **Kieli** Englanti

Tiivistelmä

Tutkin eri hajauttamisstrategioiden vaikutusta yrityksen verrokkiryhmällä korjattuun yritysarvoon ja kannattavuuteen Pohjoismaissa vuosien 2012 ja 2018 välillä. Haastan yleisesti aiemmissa tutkimuksissa käytetyt metodit, ja käytän verrokkiyritysten määrittämisessä uutta yhteisten osakeanalyytikoiden metodia, jonka kehittivät Kaustia ja Rantala (2018). Minun tulokseni näyttävät, että Pohjoismaissa on merkittävää hajauttamisalennusta arvostettuna läheisesti hajautetuille ja kaukaisesti hajautetuille strategioille, kun näitä strategioita verrataan yhteisten osakeanalyytikoiden menetelmällä simuloituihin fokusoitua strategiaa edustaviin verrokkiyrityksiin. Näytän myös, että lähde yritysten arvoon määritetylle hajautusalennukselle tulee huonommasta operatiivisesta kannattavuudesta näissä hajautusstrategioissa fokusoituneisiin verrokkiyrityksiin verrattuna.

Avainsanat Hajauttamisstrategia, hajautusalennus, kannattavuus, verrokkiryhmä

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1 Introduction

1.1 Background and motivation

The motivation of this thesis is to add on to the existing and versatile, yet still not consistent, literature on the link between firm performance and firm's diversification strategy. Academics in corporate finance and strategic management have eagerly been studying for decades the effect of corporate diversification on firms' market and accounting based performance measures. The studies have been made with varying methods and empirical results. The so-called diversification discount is quite tenacious and accepted theory in the literature, or at least had strong empirical backing in 1990's in the U.S. markets. The theory suggests that diversified corporations operating multiple business segments in multiple product-markets have a discount in their market value compared to single-segment firms focusing only on one product-market where their core competencies lie (e.g. Lang and Stulz, 1994; Berger and Ofek 1995; Comment and Jarrell, 1995). In other words, the optimal strategy based on this theory is that firms should focus on one product-market and let the investors diversify their portfolios. This is because investors can diversify to publicly traded stocks more cost-effectively at market prices, i.e. they don't have to pay the hefty premiums to the current market price, which is the case in a typical corporate acquisition (Porter, 1989).

However, diversification discount theory was challenged later on by some researchers (e.g. Campa and Kedia, 2002; Villalonga, 2004; Miller, 2006), and hence, the theory of curvilinear relationship, an inverted U-shape[1], between diversification strategy and firm performance started to gain more foothold in the academia. Inverted curvilinear relationship means that related diversification can improve the firm performance compared to focused firms, but when moving further towards unrelated diversification strategy, it starts to decrease the performance at some point (e.g. Rumelt, 1982; Markides, 1992; Palich, Cardinal and Miller, 2000). This view is quite strongly supported in the recent literature, and especially in the strategic management literature that usually

[1] Inverted U-shape and curvilinear relationship indicates the shape of the line if focused strategy is in the left side of the x-axis, related diversification in the middle and unrelated diversification in the right side, when firm value or operational profitability is in the y-axis, and when related diversification gives the highest peak value. Regression models used in this thesis are linear.

approaches diversification from a resource-based view. This view means that business segments can be relatedly diversified if they share some valuable, rare and non-imitable resources in their operations, not just similar end-product market (Markides and Williamson, 1994; Miller, 2006). In the corporate finance literature however, there is a lot of evidence supporting the diversification discount hypothesis where both, related and unrelated diversification, destroy firm value (e.g. Berger and Ofek, 1995; Lins and Servaes, 2002). Moreover, there is also support for the assumption that related diversification could outperform unrelated diversification strategy, some academics arguing that related diversification generates positive and unrelated negative excess value (Graham, Lemmon and Wolf, 2002; Villalonga, 2004). Some other studies however, show contradictory results suggesting that unrelated diversification could also create value under some conditions (Gomes and Livdan, 2004: Maksimovic and Phillips, 2002). Therefore, it still seems to be under controversy, which corporate strategy is the optimal for the shareholders of the publicly listed companies: focused strategy or some level of diversification.

Recently, some academics have also criticized the methods typically used in corporate finance literature to determine the excess value based on Standard Industrial Classification (SIC) code industry peers (Villalonga, 2004). Moreover, the aim of creating a general theory for the optimal diversification strategy on average have been under a scrutiny, and instead researchers have provided insights that diversification choice could be endogenous and an outcome of the industry-level environment and shocks combined with firm specific heterogeneous characteristics to be able to respond to those shocks (e.g. Campa and Kedia, 2002; Ahuja and Novelli, 2016; Schommer, Richter and Karna, 2018). When controlling for the endogeneity of the diversification decision by determining the probability of the firms to diversify, Campa and Kedia (2002) showed that diversification discount disappears or turns into a premium.

All in all, I still believe that there are strong practical benefits for both, academics and practitioners, prompting from empirical study trying to explain with a novel approach to a methodology, which diversification strategy seems to yield the best results in terms of the firm value and operational profitability. In addition, my study is approaching the relationship more from the corporate finance theory perspective, thus the goal of trying to study motivations and results of firm-specific strategic choices at an individual level is out of the scope of this study, even though Ahuja and Novelli (2017) suggest this kind of approach in strategic management literature. Naturally, the optimal

strategic choice and degree of diversification cannot be the same for every firm, but understanding what could on average generate positive outcome is of beneficial use to managers considering the best diversification strategies in order to maximize the value of the firm, as well as to investors analyzing the investment decisions and allocations in their portfolio.

1.2 Research questions

As discussed above, the field of research on the relationship of diversification and firm performance has been under controversy and eager study during the past four decades. It is shown by a number of studies, that the level of diversification discount or premium is also dependent on the geographical markets and their features. For example, Lins and Servaes (2002) did not find any significant diversification discount in Germany in their study, while they found 10% and 15% statistically significant discount in Japan and in the UK, respectively. Moreover, Khanna and Palepu (2002) found that in Indian markets, conglomerates outperformed focused firms. As the majority of the studies and thus, the theory, are based on the U.S. capital markets, and none to my knowledge is considering only Nordic markets in published journals, I am interested in finding the answer to what the effects of different diversification strategies[2] are to firm performance in the Nordics. Firstly, I am interested in the effect on the firm value, and secondly to the operational performance based on profitability measure. Thus, I have the following research questions directing my thesis:

Research question 1: Which diversification strategy has been the best for the shareholder wealth based on the excess firm value in the Nordics after 2012?

Research question 2: Which diversification strategy has been operationally the most profitable in the Nordics after 2012?

Research question 3: What fundamental reasons are the sources for the performance effects of the diversification strategies?

[2] Focused corporate strategy is in this paper considered to be also one of the diversification strategies, i.e. ”non-diversified” strategy.

1.3 Contribution to the literature

My research contributes to this ongoing discussion of diversification strategy and firm performance linkage by utilizing a novel method for determining the excess market value and excess profitability of the diversified - vertically, relatedly and unrelatedly - firms in relation to their focused peer group. I utilize a common analyst -method created by Kaustia and Rantala (2018) in forming the peer group for relative value and operational performance comparison methods. The common analyst -method utilizes the information externalities produced by equity analysts as they typically decide to focus on specific set of companies and industries sharing some fundamental features, i.e. being homogenous as a group, allowing the analyst to specialize and exploit the information collected in analyzing multiple equities at the same time. So, I measure the excess value by dividing the market value of the firm by its intrinsic value calculated from common analyst peer group median value multiples. This is exceptional compared to methods usually used in the literature in this field: researchers have been assigning comparable industry peer groups based on industry codes, typically SIC codes (e.g. Wernerfelt and Montgomery, 1988; Berger and Ofek, 1995; Rajan, Servaes and Zingales, 2000; Campa and Kedia, 2002). Then, normally excess value is constructed using Tobin's q based measures or adjustments of it, where firm's current capital market value is divided by its replacement cost (Lang and Stulz, 1994) or imputed value presented by Berger and Ofek (1995), where the relative value is based on SIC code industry peer's multiples. Even though SIC code data is widely available and easy and quite effortless to use, there have been also critics towards it (Rumelt, 1982; Villalonga, 2004).

SIC codes are categorized based on end product markets, but this is not always the best way to measure the comparability of the two different businesses, and in some SIC codes they can be quite misleading in producing homogenous peers. Good example of the misleading ability of the SIC code categorization is presented by Kaustia and Rantala (2018), when they show that Dolby Laboratories, a licensor of audio, 3D and other technologies to be used in Blue Rays and movie theaters, gets a SIC code under 6794, for "Patent owners and lessors". The peers then are other patent owners, e.g. Choice Hotels International, which are operating in a totally different business context. Kaustia and Rantala's method, however, generates peers that are also in the entertainment and media business, such as Time Warner and Viacom, which are actually vertically linked to

Dolby Laboratories in the value chain. Therefore, my novel approach to use common analysts - method in forming the peer group is taking into account some of these critics in prior literature, and could be forming peer groups that are more homogenous in their characteristics and opportunities, and therefore similarly exposed to same industry shocks affecting the market values and operational performances of the listed firms.

Moreover, my research contributes to the literature by looking into Nordic stock markets specifically, which have not been a target of published academic research in this field to my knowledge so far. As shown by many studies (e.g. Krishna and Palepu, 2002: La Rocca, La Rocca and Vidal, 2018), the effects of diversification strategy on firm value has been quite different depending on the geographic markets used. This is due to many varying country and market specific characteristics, such as the development of the capital markets, the strength of the local institutions, the enforcement of the investor protection and proprietorship laws and the share of insider or blockholder shareholders in listed companies (Wan and Hoskisson, 2003; Ferris, Sen and Thu, 2010). So, the current state and degree of the development in each of these characteristics is showed to affect also the value effect of diversification strategies. Therefore, study concerning only Nordic countries, although not fully homogenous group of countries, is of interest as well.

Furthermore, as the time horizon of my study ended up being 2012-2018, I hope to bring new evidence on the diversification – firm performance relation also from the current business environment and trends, and see whether the results and theoretical explanations are still up to date. The time horizon of six last years was picked to follow a typical study made in the prior literature, to keep the manual work manageable, and it was also a result of the data retrieving limitations discussed in the Section 1.5. It is clear that the technological change has been rapid since 1990's due to the establishment of Internet and due to the massively increased computing power of the computers to a situation where machine learning algorithms and other applications of artificial intelligence are shaping the way people live and how business operations are run today. Like Ahuja and Novelli (2017) write, majority of the diversification and firm performance relationship studies have been conducted on a pre-Internet era. Hence, they discuss whether the rapid development of the information communications technologies could have changed the coordination costs of organizing activities inside the corporation compared to costs of organizing these actions outside the corporation. Therefore, it is also highly interesting in this study to see

whether the traditional industry lines have been fading away or if the new emerging technology and service-based industries are affecting in a way that could change the understanding of the diversification strategies' impact on the firm performance. I will also take the current technological innovations' broad applicability and following change of business models into consideration when categorizing firms into groups of related, unrelated, vertical and focused firms in Section 4.

1.4 Main findings

This study builds on the extensive earlier literature on the diversification and firm performance relationship and provides empirical evidence on this relationship in the Nordics during 2012-2018. My empirical study shows that there seems to be evidence backing the diversification discount in the Nordic markets during this time horizon. The related and unrelated diversification strategy dummy variables in my sample indicate statistically significant negative coefficients, -0.22 and -0.28 respectively, when regressed to the excess value of the firm computed from the common analyst based focused peers' relative value. So, my findings suggest that diversification strategy decreases the enterprise value -22% in related diversifier group and -28% in unrelated diversifier group. The vertical diversification strategy in my sample does not generate statistically significant results from zero, even though it has a negative coefficient sign, and therefore cannot be interpreted to perform differently from the focused group. Thus, vertical diversification cannot be stated to neither destroy nor create firm value based on my empirical evidence.

Moreover, I show that related and unrelated diversifying strategies are also outperformed by focused strategy in operational profitability, when measuring it based on common analyst peer group adjusted excess EBIT-margins. The diversification seems to lower the profitability 7.1% in related group and 7.4% in unrelated group when regressing the excess EBIT-margin on financial controlling variables and diversification dummies. Again, the vertical strategy is not significantly different from zero, and cannot be stated to perform worse or better than focused group, even though it has a negative sign in its coefficient. So, in both value and profitability measures, unrelated diversification is the worst performing strategy and related diversification slightly less negatively performing than unrelated. Overall, based on my empirical results, the focused diversification strategy can be said to bring the best results for the owners or the publicly listed firms.

My findings are consistent with many empirical corporate finance-related studies considering the diversification strategies' relationship to firm value (e.g. Wernerfelf and Montgomery, 1988; Berger and Ofek, 1995; Schneider and Spalt, 2016), and suggesting that diversification reduces firm value, and is therefore suboptimal strategy for the shareholders. However, my findings conflict with number of studies made especially after late 1990s (e.g. Palich et al., 2000; Campa and Kedia, 2002; Villalonga, 2004; Miller, 2006), which have been suggesting inverted curvilinear relationship where related diversifiers could have diversification premium whereas unrelated diversifiers have discount, or that diversification discount arises from methodological issues. My findings are contradictory to this curvilinear theory I also hypothesized in this study, so I have to reject the basic assumptions made in my hypotheses. My results, thus, indicate that when classifying companies specifically into different categorical diversification groups - also more broadly to focused group - based on their shared technologies, knowledge or assets, and when using novel method to choose the peer companies, the results could support the diversification discount theory still prevailing in the literature. I have to still note that some limitations in the data collection process and amount of data points in an average peer group could diminish the applicability of these results in practice.

In addition, I studied the sources for these value and performance effects, and found that the sources differ based on the diversification strategy chosen. I found that in related group, either cross-subsidization, information asymmetries or agency problems of divisional managers drive the underperformance. In the unrelated group, in turn, underperformance is more driven by increased coordination and administration costs combined with an underinvestment problem. Finally, in the vertical group, there is no significant under- or overperformance, and thus the transaction economic benefits between vertically integrated units are at least evened out by increased personnel costs and significantly lower investment rate, i.e. underinvestment problem. Interestingly, these operational sources are contradictory to the overinvestment theory suggested by e.g. Berger and Ofek (1995) and Schneider and Spalt (2016), but support some other justified theories for the sources of the diversification discount discussed more in detail in Section 5.3.

My thesis also brings new evidence on the Nordic markets specifically, and indicates that the capital markets in the Nordics are in 2010s functioning quite similarly to the developed U.S. markets, where there is some supporting evidence that the efficient capital markets seem to value

focused firms. My findings in the Nordics clearly imply that capital markets in the Nordics are not behaving like the less developed ones in emerging economies, where academics (Krishna and Palepu, 2002; Akben Selçuk, 2015) have found strong support for diversification premium and thus, more effective internal capital markets for publicly listed firms.

1.5 Limitations

There are couple of issues that limit the extend of my empirical analysis and overall focus of my study. First of all, the endogeneity is shown to be a significant driver in diversification discount literature. The problem here is when it is not taken into account, it could be that firms that are already underperforming end up diversifying into new industries to escape the lost competition and to find more profitable use for their assets (e.g. Rumelt, 1974; Campa and Kedia, 2002). I, however, argue that firms could also seek to diversify in order to replicate their success in one industry into another one, as Miller (2006) also argues. Moreover, if firms diversify to escape the competition into another more suitable industry, they should be able to improve their performance or then their management just cannot find the right market position for these assets and thus, should be valued at discount. All in all, I accept that the endogeneity bias might have some role in the relationship, and I am not controlling this in the regression analysis in this thesis.

Secondly and most importantly, the amount of data points ends up being one concern in this study also. In the data collection process, I had to accept the survival bias due to only getting analyst coverage for currently active equities in 2019. This skewness of data can be seen in the Figure 1 in Section 3. Moreover, after I ran the common analyst –method to get the peer groups, I could not control how large peer groups I received. Then after categorizing firms into a diversification strategy groups, the peer group size had to be almost cut in half. This is because in order to obtain the diversification strategy effect out of the firm performance, I can only use the focused peers to find the different categorical (n-1 dummy variables) effects in the regression. Thus, the biggest limitation is that the average usable peer group size is only 2.6 in the final sample, and therefore the variation in relative values and peer adjusted operational figures is rather high. This, in turn, limits the economical practicality of the empirical results to a certain degree.

One slight limitation to the replicability of this study is the somewhat subjective categorization method of diversification strategy groups. The categorical measure of relatedness, that limited the

strategic options to only four, may aggregate some information. Therefore, the degree of diversification itself is not fully included in the analysis in my study, although taken into account in the method when computing the related segments' share of total revenue. So, the degree within the categorical groups might have played some role also in explaining the diversification strategies' performance effect (i.e. in unrelated diversification group the share of the related segments' sales of total sales can be anything from 0% to 70%). I, however, believe that the choice itself to operate diversified segments already incorporates majority of the organizational and operational impacts coming along with it, therefore I preferred this categorical approach to some continuous ones.

Common analysts -method for determining peer groups also limits the ability to compare diversified firms' individual business segments and their accounting figures to focused firms' segments. That is because using that method I do not have value multiples and mean accounting figures for each specific industry segment like Berger and Ofek (1995) for example do calculate in their study. This drawback slightly limits the possibilities to interpret the fundamental reasons for discount or premium arising from each diversification strategy. I can, however, compare the different accounting figures in an aggregate corporate level at least to try to find out theoretical explanations to the empirical results. Moreover, the availability of such product segment accounting data varies a lot between Nordic markets and companies in Thomson Reuters Datastream, that would have anyway limited the segment level comparison in my study substantially.

1.6 Structure

The rest of the thesis is organized as follows. Section 2 reviews the development of prior literature on diversification strategy and firm performance relationship, presents the currently prevailing main theories and their differences and introduces the potential sources for value and profitability effects of diversification in companies. At the end of Section 2, I will state the hypotheses of my thesis. Section 3 describes the data used in this study and how and where it was obtained, and presents the annual and categorical distribution of my final sample. Section 4 introduces in detail the methodologies used in this study and compares the chosen methods to the other possible methods used in the prior literature. Section 5 presents the empirical results of diversification strategies' effect on firm value and operational profitability, explores the sources of the value and

profitability effect due to the diversification, and connects the results with the theories in the prior literature. Section 6 reports the robustness of my results and Section 7 concludes.

2 Literature review

2.1 Definition of corporate diversification

Companies have various ways to pursue growth in order to maximize shareholder value. One of the earliest academics to study growth strategies was Ansoff (1957), who presented four general strategies available for a company looking for growth and expansion. Ansoff stated that instead of considering just market for a product or customers, we should be interested in the *product mission*, that is the description of the job for the specific product to fulfill. He used aircraft corporation as an example, and stated that one of its missions is commercial air transportation of passengers. Ansoff continued that a firm's product-market strategy is a joint statement of a product line and a set of missions which the products are planned to fulfill. Then, he presented the four product-market strategies that can be pursued by corporate managers: market penetration, market development, product development and diversification.

In market penetration, companies try to grow by increasing sales to its present customers or by finding new customers for present products, i.e. without departing from an original product-market. Market development is a growth strategy in which the company is searching new markets, usually geographical, for its present product line, typically with some modifications in the product features. Product development strategy, in turn, means that a firm pursues to develop products with novel and different characteristics, but which still are working for the same mission while improving the performance of the mission. Then finally, diversification strategy means that a company will departure simultaneously from its present product line and from its present markets. The diversification strategy is distinctive to other three because it generally requires new skills, new techniques, new production facilities, and it almost always leads to changes in the physical and organizational structure of the business. Similarly to Ansoff's theory, Gort (1962) stated that at the pure form, diversification is an act of pure investment without any operational connections between the plants. Ansoff also clarified that a typical well-performing company would employ some of these product-market strategies simultaneously. Some reasons Ansoff mentioned for firms to choose diversification strategy are e.g. to compensate for technological obsolescence, to utilize

excess production capacity, to reinvest earnings, to distribute risk and to obtain top managerial skills. (Ansoff, 1957.)

Porter (1987) continued the past work made in the literature and studied the performance of the 33 diversified American corporations. He explained that in the diversification strategy, companies enter entirely new industries via mergers and acquisitions, joint venture or internal build-up. He argues that corporate strategy is the overall plan for a diversified firm, and that diversified firm has two levels of strategy: business unit (competitive) strategy and corporate (companywide) strategy. Moreover, he concluded that corporate strategy is what makes the corporate as a whole add up to more than sum of its parts. He listed three conditions under which diversification strategy can actually create shareholder value. The new industry should be structurally attractive or capable of being transformed attractive, the cost of entry should not capitalize all the future profits, and either the new business unit should gain competitive advantage from its link with the corporation or vice versa.

Porter also provided some strategic rationale options for diversification. The corporate headquarters could use portfolio management strategy where it supplies capital to the units, i.e. creates internal capital markets, and employ professional management techniques in them. Additionally, diversification could be chosen by a corporate to restructure the new unit which is underperforming or otherwise undeveloped, and create value by improving its operational performance. Furthermore, transferring skills and employees and sharing knowledge and activities are also mentioned by Porter for value creating diversification strategies. (Porter, 1987.)

In addition to understanding diversification to only mean that companies enter totally new industries, some strategic management academics started to study the degree of relatedness between the business units of a diversified firms, and became to classify them based on the relatedness. Rumelt (1974), for example, classified firms into a four categories based on how related the different business units are, and presented single-business, dominant-vertical, relatedly diversified and unrelatedly diversified strategies. He explained that relatedness means the extent to which a firm's different business lines are linked by a common skill, resource, market or a purpose. Moreover, he defined that diversification is a matter of degree of relatedness among the activities undertaken by a firm. Rumelt later (1982) argued that the appropriate level of product

diversity could be that which balances economies of scope arising from diversified operations with diseconomies of organizational scale arising from increased coordination costs. Markides (1992) also demonstrated that if a firm goes beyond the level of diversification where increased coordination costs outweigh economies of scale, the firm will suffer via decreased market value. In the corporate finance-related literature, academics also started to study the firm value effects of the diversified firms, classifying them as diversified only based on different SIC code industries of the business units (e.g. Wernerfelt and Montgomery, 1988).

2.2 Major trends and theories for the diversification - firm performance relationship

In the 1960s, American companies experienced a wave of large scale mergers and acquisitions when companies undertook a massive diversification programs. One following consequence of this merger peak was the prominence and popularity in creation of large conglomerate firms. (Berger and Ofek, 1995.) In the 1970s and 1980s, however, firms started to once again decrease their level of diversification (Schommer, Richter and Karna, 2018). The early strategic management literature stated that there was no significant relationship between diversification and firm performance, indicating that when firms became conglomerates and entered new markets, existing firms had no special advantages (Arnould, 1969).

However, soon academically accepted theories around the diversification theme started to emerge in the literature. The resource-based view supported by Rumelt (1974) and later for example Markides and Williamson (1994), indicates that different business units drawing on the same resource, skill or knowledge can outperform firms with unrelated business units and even single-segment businesses based on accounting metrics, suggesting a curvilinear relationship. Markides and Williamson (1994) went further than Rumelt, and argued that economies of scope is not enough for a long-term competitive advantage stemming from diversification, it is rather based on shared strategic assets between the units. These strategic assets should be able to act as a catalyst to the creation of new market-specific assets that are non-substitutable, non-tradable and costly or slow to imitate, hence acting as a base for competitive advantage.

In addition, the transaction-cost economics theory explained by e.g. Teece (1980) suggests that when corporates have lower internal transaction costs to exchange common inputs and

competences than what these transaction costs would be in external open markets, firms are able to gain from diversification. External inefficiencies in transactions could arise from information asymmetries between the exchange parties, because it can be costly to provide or acquire information. According to Teece (1980), the circumstances under which internal transaction costs can be lower is possible when the production of two products is dependent on the same proprietary knowhow base (intangible asset), and when two or more products are produced using specialized indivisible asset as a common input. To put it more clear, when diversification exploit economies of scope that cannot be duplicated by equity investors on their own or that cannot be replicated via transactional markets, diversification could create shareholder value. (Teece, 1980.) All in all, the resource-based view and the transaction-cost economics are both in a way emphasizing the knowledge based, organizational capabilities that are mostly intangible when considering the operational benefits of the diversification. The firm performance was usually measured on accounting figures, like return on capital or equity, in the strategic management literature.

However, in 1990s, corporate finance academics started to challenge the view that diversification and conglomerates are creating value for shareholders. Numerous studies using U.S. data concluded that diversification is actually destroying firm value, therefore providing empirical evidence on the diversification discount theory. For example, Lang and Stulz (1994) found a negative relationship between diversification and Tobin's q measure, when comparing diversified firms to their single-segment industry peers. Berger and Ofek (1995), in addition, found a strong value loss effect due to the diversification, magnitude being between 13% and 15% of the firm value. The value loss in Berger and Ofek's study was smaller for more relatedly diversified firms based on SIC codes in their study. They concluded that the source for the value loss was due to the overinvestment and cross-subsidization, i.e. suboptimal managerial behavior or inefficiencies in internal capital markets. Moreover, Comment and Jarrell (1995) found that firms which decided to refocus after their diversification action actually experienced increase in their firm value. Also, Bodnar, Tang and Weintrop (1997) found that average value of a company with multiple industrial segments was 5% lower than a comparable portfolio of focused firms.

Therefore, and since the 1990s, the diversification discount theory has been among one of the most persistent and disputed theories. Also, because the diversification discount was mostly accounted to suboptimal decisions made by the managers in the finance literature, the third major explanation

for diversification, agency costs theory, received a lot of support. Agency problems issue was raised by Amihud and Lev (1981) already in the early 1980s, when they argued that diversification can be explained by the agency problems between managers and shareholders, and that managers diversify to protect their human capital. Jensen's article on free cash flow and corporate governance (1986) continued the literature on agency problems, and he suggests that companies undertake diversification because the managers want to increase their private benefits they derive from the corporation.

Since the late 1990s and especially in the 21st century, academics both in corporate finance and strategic management have been challenging the vastly accepted diversification discount theory with some empirical backing. Palich, Cardinal and Miller (2000) examined the past development of the research on diversification and firm performance, and argued that the curvilinear relationship is the most prominent one, where related diversification leads to a higher performance while unrelated diversification lowers it. The results were consistent when taking into account market and accounting based measures. Next, Graham, Lemmon and Wolf (2002) challenged the theory by arguing that much of the excess value loss due to the diversification occurs because firms that diversify through acquisitions buy already discounted businesses. Thus, they also casted some doubt on the standard assumption that divisions of conglomerates can be compared to stand-alone industry peers. Furthermore, Campa and Kedia (2002) continued also in the subject of selection bias, meaning that already discounted firms "self-select" to diversify in order to find more profitable use for their assets. This "escape hypothesis" was originally published by Rumelt already in 1974, when he argued that underperforming firms tend to escape the industries were they cannot compete into more attractive markets. So, Campa and Kedia (2002) therefore challenged the standard methods used in corporate finance literature, because they tend to miss this endogeneity of the diversification choice made by firms. When they control for endogeneity in their study, they found that when they jointly estimate the diversification decision and firm value effect, the diversification discount is more likely to be a premium. On the other hand, Miller (2006) points out that also high performance may encourage firms to diversify, because firms want to extend or replicate their competitive advantage into new markets as well.

The use of SIC code based industry peers was also challenged by Villalonga (2004), when she used business information tracking series instead, and constructed more consistent peer business

units instead of relying on SIC code segments. Her findings gave evidence on the inverted curvilinear relationship as well, suggesting that there is a discount to unrelated (conglomerate) diversification, but a premium to related diversification. She utilized the imputed value method like Berger and Ofek (1995). Villalonga therefore shed new light on the measurement error that can come from firms' tendency to aggregate segment data when reporting the performance of their operating activities. This strategic accounting theory indicate that diversified firms would appear as underperforming firms when compared to stand-alone peers due to this intentional aggregation of data. Other academics also criticize the methods typically used in the literature, and e.g. Ahuja and Novelli (2017) suggest that the effect of diversification strategy is best studied in a micro mechanism level. They argued that the aggregating studies lose some information, and the effect and success of diversification could be studied individually through the estimated operational synergies and how these targets were met later. Glaser and Muller (2010), in turn, argued that the use of book value of debt in enterprise value based measures underestimates the excess value of conglomerates, because the book value of their debt could potentially increase after the diversification action via lowered cost of debt leading to a higher overall enterprise value.

Miller (2006) took a novel angle in explaining the diversification and firm performance, and studied the link between Tobin's q and corporate's technological diversity. He also stated that the greater the percent of tangible assets, the less value can be created via diversification. This assumption was justified with an explanation that capital intensive projects can be more easily funded in external markets, because no crucial information is revealed to the markets in capital heavy projects and therefore these projects are better governed through external markets. Miller's (2006) findings support also a premium for related diversifiers, when he concludes that diversified firms with high share of knowledge based, intangible assets with broad applicability across industries can outperform diversified firms and also single-business firms with no such economies of scope. More recently, Schommer, et al. (2018) provided some support for the inverted curvilinear relationship, while also explaining that the levels of unrelated diversification have decreased and levels of related increased since the 1990s when a vast amount of studies were made. Their argument is that while the overall levels of diversification might have declined over time, the average firm performance effect for the ones using diversification strategies may have become more positive.

At the same time when there is a vast amount of literature on related and unrelated diversification strategies, the effect of pure vertical integration as a diversification strategy has not received as much of interest. Rumelt (1982) showed negative effect on firm performance from vertical integration, and Ilinitch and Zeithaml (1995) argued that business units that are in the same vertical part of the value chain are actually more similar to manage than those in different stages like in vertically integrated firm. This implies that more complexity is involved in managing vertically integrated units, and hence the coordination costs could increase. However, D'aveni and Ravenscraft (1994) argued that the positive integration economies arising from vertically diversified strategy could slightly outweigh the increased administration costs, and lead to a marginally better profitability. Shackman (2007) more recently studied the relationship of capital market development and vertical integration, and suggested a positive relation between them. Shackman also points out that vertical integration actually increase commitment to a specific industry instead of diversifying the risk away. Overall, the effect of vertical integration strategy to a firm value has not yet received a consistency in the literature, but it can be considered to perform close to unrelated diversification strategy, since the coordination costs could increase via increased complexity. All of the methods using SIC codes are actually considering vertical integration as being part of the unrelated group, further giving backing to the assumption that they perform similarly. However, I am separating these strategies in my thesis.

2.3 Geographical differences in the relationship

Until the late 1990s, most of the diversification – firm performance papers were studying only the U.S. markets. Therefore, it started to interest academics whether the effect is existing also in European and Asian or emerging markets. Lins and Servaes (2002) were among the first to apply this study into the other parts of the world, namely the U.K., Germany and Japan, using data for 1992 and 1994. They found that the diversification discount was statistically significant in the U.K. and Japan, 15% and 10% respectively. In Germany, however, they did not find statistically significant discount. They explained that in Germany, the higher share of concentrated insider ownership of the firms may be the reason why the diversified firms are governed more strictly, and thus the discount does not exist there. Moreover, Khanna and Palepu (2002) were using Indian markets with their rather weakly functioning institutions and thus, severe agency and information

asymmetry problems. As they hypothesized, they found that the most diversified Indian business groups outperformed focused comparable firms based on accounting and stock market measures.

Wan and Hoskisson (2003) studied samples from six Western European countries and examined also the relationship of the external environment on diversification and firm performance link, namely factors that facilitate transformational activities, and institutions that encourage transactional activities. They suggest that the home country business environment is an important factor affecting the outcome of the corporate diversification strategies. They found a negative effect on firm performance from product diversification in developed environments and positive in less developed environments. Fauver, Houston and Naranjo (2003) reported similar relationships as well. Ferris, Sen and Thu (2010) also looked into the external environment, and found that firms in less developed nations are more likely to diversify, implying higher benefit of internal capital markets in economies where it is costlier or difficult to raise external capital. The overall value effect in their study was still that industrial diversification reduces excess value. Akben Selçuk (2015) confirmed the results shown by Wan and Hoskisson (2003) with data from emerging markets, and concluded that there seem to be a diversification premium for diversified firms compared to single-segment industry peers in emerging markets.

Overall, there seem to be two kind of geographical markets for corporate diversification: developed economies with functioning capital markets and institutions, and less developed economies with poor institutions where it is beneficial to utilize internal capital markets via diversification. Finally, La Rocca, La Rocca and Vidal (2018) underlined this assumption, when they researched Italian markets and showed that related diversification can be value destroying strategy due to the inefficient decision-making, but that conglomerate strategies (i.e. unrelated) increase the firm value because of the poorly functioning financial markets in Italy, and because the benefits of the internal capital markets.

Next, I will present the main theoretical arguments provided in the literature for the sources of the diversification discount and premium in the organizations, some of them also mentioned in the previous Section 2.2.

2.4 Sources of the diversification discount

To begin with, Jones and Hill (1988) explained the discount by stating that diversification beyond a certain degree increases internal administration and governance costs to the point where performance suffers. Hoechle, Schimid, Walter and Yermack (2012) discuss also that the discount can be partly explained by poor corporate governance. They control for governance level in the firms in their study and find that the discount diminishes. Moreover, when a firm is entering a new market with a little connection to its main business, it often times lacks some managerial resources and knowledge of the industry to overcome the competition there (Santarelli and Tran, 2016). As an operational cost evidence, Schoar (2002) pointed out that conglomerates exhibit 8% higher salary costs on average, and that this might cause the reduction of productivity in the diversified companies.

Stulz (1990), however, argue that diversified companies are investing too much in business units with weak investment opportunities. This is especially true if managers have a lot of cash resources or unused debt to undertake these value-decreasing projects. Therefore, the units with weak outlook have access to more capital than they would on their own. Berger and Ofek (1995) also found evidence that suggest the overinvestment in diversified firms' business segments is one of the main reasons for the diversification discount. Similar findings are presented later by Schneider and Spalt (2016), who also argue that conglomerates invest more in high-skewness return segments than their comparable stand-alone companies, leading them to trade at discount. They consider overinvestment to be created by CEOs' long-shot bias, e.g. hubris. Connected to the overinvestment argument, Jensen (1986) suggests that due to the easier access to free cash flow, diversified firms end up investing more in negative net present value projects than what the segments would as stand-alone companies. Meyer, Milgrom and Roberts (1992) also point out that in a conglomerate, capital will flow also to failing business segments, i.e. these segments are cross-subsidized by the better performing segments. As an independent firm, the failing segment would before long end up being distressed. Thus, a publicly listed single-segment firm cannot have negative equity value like the failing but subsidized segments can keep destroying the overall firm value as a part of a conglomerate.

Overinvestment and cross-subsidization are very much connected to the agency problem theory, where the incentives of the agent and the principal are not aligned. Typically, this means that

managers and shareholders' incentives differ, because managers are more risk averse over their human capital, or because they could engage in empire building via diversification to obtain private benefits. Since unrelated diversification could relax the credit constraints leading to more capital under the control of the management, the private benefits could be created this way. (Stein, 1997.) But agency problems exist also between corporate headquarters and managers of the business units in a diversified company. Scharfstein and Stein (2000) model these agency issues in their study and show how the division managers can subvert the functioning of internal capital markets with their rent-seeking behavior. When they employ this kind of rent-seeking behavior, the division managers can increase their bargaining power and their total compensation from the firm CEO. Interestingly, Scharfsetin and Stein's model also imply that there exists "socialism" kind of allocation in internal capital markets, meaning that the weaker divisions get subsidized by the stronger ones. Rajan et al. (2000) added that internal power struggles can be a significant factor distorting the allocation of capital between the divisions. They continued that if the divisions are similar with the level resources and opportunities, internal capital markets will succeed in allocating the resources to most efficient divisions. But when the diversity in these metrics increase, resources will flow from divisions with good to divisions with poor investment opportunities.

Finally, as discussed by Myerson (1982), the information asymmetries between central and divisional managers are inevitable in decentralized firms, and that these costs could cause diversified firms to have lower profitability than what the divisions could have separately. They stated also that the argument is the same for related and unrelated diversifiers. Overall, diversification discount theories suggest that focused firms have better transparency and thus, external markets are able to monitor them effectively and take controlling actions to prevent management of destroying shareholder value. Such available corporate control actions for investors are e.g. company takeovers, leveraged buyouts and managerial turnover (Lamont and Polk, 2002).

All in all, theories suggest that the diversification discount could come from e.g. increased coordination, governance and administration costs, suboptimal managerial decisions, information asymmetries between the divisions and headquarter, overinvestment, cross-subsidization or from other sorts of agency problems.

2.5 Sources of the diversification premium

On the other hand, there are quite many sources for the potential diversification premium mentioned in the literature. Starting with the internal capital markets justification, e.g. Weston (1970) explained that diversified firms have internal capital markets that allow them to allocate capital more effectively than what is possible via external markets. Stulz (1990) continued the argument and stated that when creating larger internal capital markets, diversified firms are capable of alleviating the underinvestment problem raised by Myers (1977), leading to more positive net present value investments undertaken compared to what the divisions would make as separate firms. Furthermore, Stein (1997) argues that internal capital markets could sometimes work more efficiently when the corporate headquarters manages a small and focused set of projects. Stein also explains that unlike a bank, headquarters can engage in "winner-picking" among the projects, and actively shift the funds from one project to more promising one, making the allocation of scarce resources more optimal. Thus, the headquarters can create value even if it cannot relax the overall credit constraints of the corporate.

And what comes to the relaxing credit constraints, various academics have suggested that diversified firms benefit from imperfectly correlated earnings streams, and can due to this "coinsurance effect" obtain higher levels of leverage from debt financiers than focused peers of same size. More levered firm can create shareholder value through higher interest tax shield. (e.g. Berger and Ofek, 1995; Aivazian, Qiu, Rahaman, 2015.) Aivazian et al. (2015), however, point out that the benefit from coinsurance effect on diversification is non-linear, so as the extent of diversification increases, the cost-benefit decreases. Another way the coinsurance effect could create value is via lower corporate-wide tax payments. Berger and Ofek (1995) explained that conglomerates are predicted to pay less taxes than the segments would if they were operated separately. This is because a conglomerate can reduce the losses made somewhere from the earnings generated elsewhere.

Other possible theories for diversification premium suggested in the literature include the economies of scope arising from the common knowledge, skill or strategic asset used in different segments. The employment of these kind of economies of scope could lead to a long-term competitive advantage and thus, above average profitability for example via lower relative operating, marketing or channel management costs (Rumelt, 1982; Markides and Williams, 1994.)

Moreover, as Miller (2006) explained, intangible knowledge-based assets and broadly applicable technologies in diversified firms can be the sources for better operational performance. In addition, the utilization of common knowledge and technologies can lead to lower R&D costs in relation to group sales for related diversifiers, like e.g. Bettis (1981) and Campa and Kedia (2002) show in their studies.

All in all, the effect of diversification on firm value is at the end the sum of the negative and positive effects arising from internal capital markets or sum of the effects from scope economies and use of strategic assets versus increased coordination costs, agency problems and complexity in organizations.

2.6 Hypotheses

Based on the above discussed reasons and prevailing theories in the prior research, I think it is fair to carefully assume that related diversification could outperform focused, vertical and unrelated diversification strategies due to the economies of scope that cannot be imitated. I thus, assume that some kind of inverted curvilinear relationship exists also in the Nordics in 2010s between firm value and its diversification strategy. I believe that Nordic economies and financial markets are rather developed compared to e.g. Italy and India, where researchers found diversification premium. Therefore, I form the following two hypotheses for which I try to get empirical evidence:

H1: *Related diversification strategy is positively linked to firm performance based on firm excess value*

H2: *Unrelated and vertical diversification strategies are negatively linked to firm performance based on firm excess value*

Then, continuing the study of the diversification's effect on firm value, I am also interested in finding out the implications to operational performance. In the prior literature (e.g. Palich et al., 2000) there are quite strong evidence backing up the theory that related diversifiers enjoy also better operational profitability, while unrelated and possibly vertical strategies could lead to worse operational performance. Hence, I assume that the inverted curvilinear relationship could exist also when studying the profitability. I form my next two hypotheses as follows:

H3: *Related diversification strategy is positively linked to firm performance based on excess profitability*

H4: *Unrelated and vertical diversification strategies are negatively linked to firm performance based on excess profitability*

3 Data

3.1 Sample selection

In this thesis I decided to study diversification strategies' effect on firm performance specifically in the Nordic countries, excluding Iceland due to its small number of listed equities. The rationale of doing this is to get larger scope and amount of observations to my study compared to only studying e.g. companies listed in Finland. Although Nordic countries are not completely homogenous group of business environments (e.g. different currencies, natural resources and industry specializations), they are all considered developed economies and also welfare states that share some essential societal structures and have a lot of trade between them. Moreover, there are many companies that are interrelated across the borders of these countries. Therefore, I included all the publicly listed equities in the four major Nordic exchanges, Copenhagen, Helsinki, Oslo and Stockholm, between years 2012 and 2018 into my sample. The time period is chosen to study the effect of this phenomenon with the latest data possible while getting still enough observations. The vast majority of the research made on diversification strategies' effect on firm performance is from the earlier time periods, so it is of interest to see whether the current economic and technological development have made some changes to the relationship.

So, I started my data collection by retrieving all the listed equities during 2012-2018 in the abovementioned stock exchanges from Thomson Reuters Eikon database. Similarly to common practice used in this field of academia, I excluded all the financial, insurance and real estate firms with SIC Codes between 6000-6999, because they cannot be compared with the same accounting metrics to other industries and because the nature of their operations is quite different. This left me with 1,377 listed equities.

3.2 Analyst coverage sample

To proceed, I obtained data on the equity analyst coverage of the sample firms and excluded the ones with no analysts following them. This is because I use the common analysts -method to determine my peer groups, explained more specifically in the Section 4. The analyst coverage data is also from Thomson Reuters Eikon, with the limitation that it only provided real-time data, i.e. analysts following currently active equities (no data on discontinued equities) without specifying their starting year of following the specific firm. This limited the sample size substantially, but for the common analysts -method to generate enough peer groups, I had to make an assumption that the analysts have been following the same firms since the beginning of 2012 or since the beginning of his/her analyst code to become active if later than 2012, to 2018 or to the year the analyst code became passive. Naturally, if the company was listed some year after 2012 and the analyst was currently following it, the assumption was that the analyst started to follow the firm once it became public.

This assumption is not truly realistic, but it gives a good estimate what firms the analysts have actually followed during these years. As the analysts tend to specialize in one industry or set of related firms (Boni and Womack, 2006), it is unlikely that they have totally changed their coverage during just seven years. After completing this phase, I had 467 firms, 2,959 firm-analyst pairs in 2018 and altogether 10,386 observations in my sample when taking all the annual observations into account. So, on average each firm had 6.33 analysts following them in 2018 and one analyst-firm pair was present on average 3.66 years between 2012 and 2018. Due to the analyst coverage real-time limitation, the sample is annually skewed to the latest years (see Figure 1).

The next step in my study was to utilize the analyst coverage sample to run the common analysts -method simulation to get the peer groups. This reduced the sample size quite much, because there are many small firms with very little coverage, because the analyst coverage is not as extensive in the Nordic countries as is the case in the U.S. capital markets used by Kaustia and Rantala (2018) and because the analysts following Nordic companies often seem to focus mostly on one geographic stock exchange or the stock exchange of their domicile, lowering the possibility of cross-border peers simulated by the method compared to the U.S. markets. In total, the simulation generated peer groups for 224 firms with at least one yearly observation during the time period, with the mean peer group size being 4.82. In the peer groups, there were altogether 204 individual

firms from which only one was not itself having a peer group of comparable firms. This is because the common analysts -method does not require mutual relationship for the identified peer firms: it is possible that firm A has firm B as a peer, but firm B does not have A as a peer (Kaustia and Rantala, 2018). As can be seen from the Table 1, I also had to omit firms that did not have focused firms as peers, since I need to separate the diversification strategies' effect from focused strategy and from each other. This reduced the final sample size with extra 81 companies together with the ones that did not have fully usable data for the empirical analysis, and thus I ended up with rather small final set of 143 study firms and correspondingly 81 focused firms that could be used as peers to define the excess value and profitability measures. Table 1 presents the "waterfall" from all publicly listed Nordic equities to my final sample size.

Table 1: Sample selection

Sample Characteristics	**Number of firms**
Publicly listed equities in Nordics 2012-2018 (excl. Iceland and financial firms)	1,377
Excluding passive equities and ones without analyst coverage	(910)
Excluding equities not passing common analyst -simulation	(243)
Excluding firms with no focused peers or with missing data points	(81)
Study sample	**143**

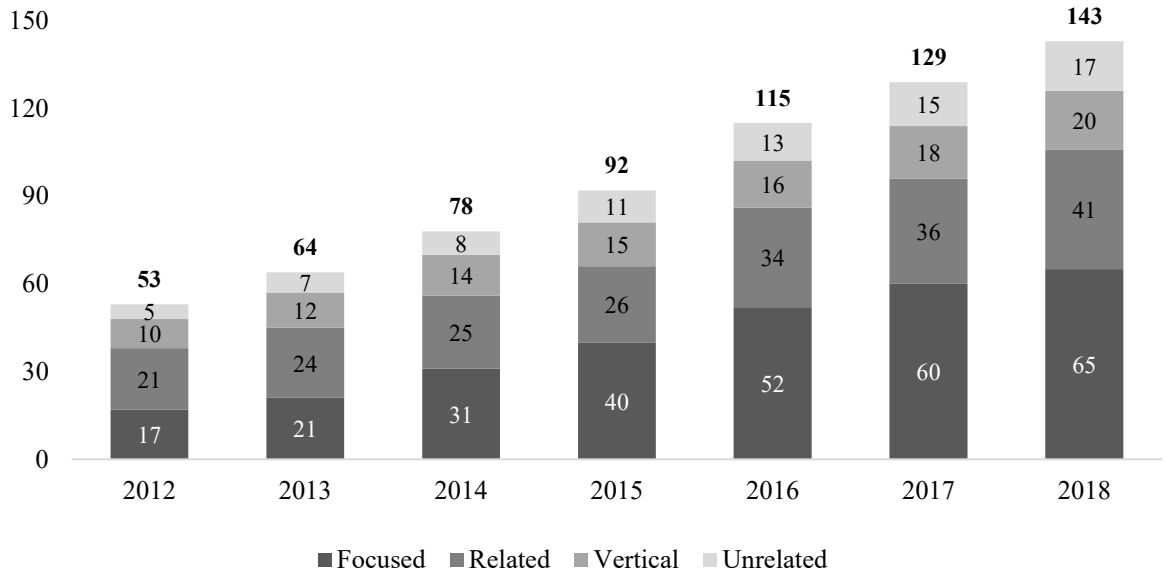
3.3 Categorization to different diversification strategy groups

After simulating the peer groups for 224 firms, I needed to categorize each firm into one of the four diversification strategies discussed more closely in Section 4. Because the categorization was made based on the segment sales of the firms, I first utilized Thomson Reuters Datastream database to obtain product segment based SIC codes reported by the companies to initially classify all the firms with only one reported segment into a focused group. Then, I collected segment sales information from firms' IFRS-standard annual reports manually for all the firms with sales in more than one segment. Based on this data, I was able to categorize the firms into a correct group using method derived from Rumelt's (1974, 1982) methodology widely used in diversification studies. At the end, I was left with 674 firm-year observations to be used in my empirical analysis. The apparent skewness towards the most recent years in my sample can be observed in the Figure 1.

Moreover, interestingly around 41% of the sample firms are classified to focused strategy on average throughout the time period, making it clearly the largest group in every year except 2012 and 2013. Related diversification (32% on average) seems to be the second most popular strategy among the Nordic companies, followed by unrelated (16%) and lastly vertical (11%) diversification strategies.

Figure 1: Distribution of sample firms annually and categorically

Figure 1 shows how my final sample of study firms is divided annually between 2012 and 2018, and categorically to diversification strategy groups focused, related, vertical and unrelated. The categorization was made based on modified Rumelt's method (1982).



3.4 Accounting and market data for the regression variables

Finally, I could use the created sample to run regressions to find out the statistical effects of the different diversification strategies. I used the total enterprise value to accounting measure multiples to calculate my dependent variable in my regressions like, for instance, Berger and Ofek (1995) and Lins and Servaes (2002), and used various accounting measures as controlling variables in addition to the categorical diversification strategy dummy variables as independent variables. Observations used in the regression were year-end market values regressed to year-end annual accounting figures. The accounting measures used in my empirical analyses were fiscal year end annual sales, total assets, EBIT, EBITDA, capital expenditures, total debt, selling, general &

administration costs, total salaries paid, R&D costs and intangible assets as well as the total year-end enterprise value, and were retrieved from Thomson Reuters Eikon database. Due to some missing data points in Eikon, some firm-year observations have to be removed, especially in the peer groups and some also in the sample firms that were in the scope of the study. When calculating value multiples for peer group firms, I removed all negative values and also clear outliers in the sample, for instance, EV/EBITDA over 50x, EV/Sales over 10x and EV/Assets over 8x. The limits were not scientifically chosen, I only use my own judgement to justify that excluding the multiples above these quite abnormal levels, the standard deviation in the peer group multiples decreased notably. This on the other hand reduced the data points for peer comparison, but in my opinion gives a more realistic estimate of the value multiples after all, because value multiples are sensitive to outlier values i.e. very small or close to zero EBITDA makes the multiple extremely high while the actual firm performance have been rather weak. Negative values and extreme outlier results were also removed from sample firms' figures. Extreme outliers (closet to + or – 100%) were removed also when I calculated the excess profitability measures based on EBIT-margin.

4 Methodologies

There were a couple of significant decisions to be made which specific methods to use in order to conduct my study. The main decisions relate to how to measure the performance of the distinctive diversification strategies, i.e. what measure and what comparable group to use to indicate the superiority of a one strategy to another, and how to separate the companies into the different diversification strategies. As discussed already in the literature review in Section 2, the results of the studies in this field have varied quite notably based on the different methods used. In addition, academics have challenged the use of some methods, e.g. the use of SIC codes as a basis for focused peer groups (Villalonga, 2004). Next, I present the methods I ended up using in my thesis and the rationale behind the choices.

4.1 Method for defining peer groups

The use of SIC codes in determining the focused comparable companies for each of the diversified firm's business segments have been under a scrutiny, although this method is widely used in finance side of the literature in this field examining the effect on market values. One reason for a critic is due to the "strategic accounting bias" suggesting that the value discount of diversification

may arise because managers aggregate their operations purposely in segments in a way that underestimate these segments' performance when compared to same SIC code single-segment firms. Managers may want to make it harder for competitors to get insights into their business by reporting this way strategically, and this ultimately distorts the results. (Villalonga, 2004.) In addition, change from one SIC code industry to another is not standard per se meaning that some industries with same two-digit SIC codes might be very similar whereas some industries with same three-digit SIC codes might look like they have nothing in common. Rumelt (1982) points out this shortcoming of using SIC codes as a measure, and indicates that they implicitly assume equal dissimilarity between different SIC classes.

However, in order to reliably research the risk-adjusted effect on the market values, the industry effect needs to be taken into account by comparing the value to some peer group which reacts similarly to exogenous shocks (Lang and Stulz, 1994). Despite the critics, majority of the significant studies considering diversification's effect on firm value have used SIC codes based comparable companies to calculate the excess market value or Tobin's q of the sample firms (e.g. Lang and Stulz, 1994; Berger and Ofek, 1995; Rajan, Servaes and Zingales, 2000; Campa and Kedia, 2002; Miller, 2006). Because of the critics and the accepted, wide use of the SIC codes in determining the peer groups, I wanted to approach this issue from the novel angle and contribute with a new method which has not yet been used in determining the peers to see if this adjusts the results somehow. Therefore, I follow Kaustia and Rantala's (2018) common analysts –method to simulate the peer groups for my sample firms based on their common equity analyst coverage.

So, Kaustia and Rantala (2018) also challenged the mere usage of standard classification systems in defining comparable companies in the academic finance literature. They state that most common classification systems have been e.g. Standard Industrial Classification (SIC) system, Fama-French industries, The North American Industry Classification System (NAICS) and the leading privately provided solution, Global Industry Classification Standard (GICS). However, they argue that peer firm identification is not that simple task since industry boundaries are constantly changing, and because totally new industries emerge while some others are withering. Kaustia and Rantala (2018) explain that equity analysts' coverage choices can act as a natural measure for company relatedness, because they reflect sophisticated professionals' views on industry boundaries and similar characteristics between firms. Furthermore, they suggest that in addition to

accounting figures, the coverage choices could also reflect other aspects of similarities between firms, such as customer segment focus (local vs global), business model (producer vs distributor) and vertical links between firms. They also argue that the coverage choices made by equity analysts reflect and adapt to the emergence of novel firm clusters and changes within individual firms also. Hence, the analyst coverage decisions create positive information externalities to the market that can be used to more accurately generate comparable set of companies. (Kaustia and Rantala, 2018.)

Because of all these benefits, Kaustia and Rantala created a method which fulfills the following criteria: to generate homogenous groups in observable and unobservable characteristics, firms within a group would be related via real economic links and that the method would react promptly to the changes happening in firms and in the structure of the economy. Thus, they developed a new method based on the common sell side equity analysts of companies. They tested its performance against the abovementioned widely used conventional classification methods, and added also a text-based network industry classification method (TNIC) that measures product-market similarity by doing a textual analysis of the firms' 10-K statements.

Kaustia and Rantala (2018) found out that their analyst method outperformed every standard classification system in producing homogenous peer groups using data from New York Stock Exchange between 1983 and 2013. They used some market based measures and various accounting measures to assess the homogeneity of the simulated peer groups of their method, and stated that the results were statistically and also economically significantly better when using their common analyst -method. Authors also suggested that the method could be beneficial when studying the relative valuation of firms, which is exactly the purpose of my study. To illustrate the actual benefit of the model and how the analyst-based peers are economically related, they showed a case example for a firm Newell Brands. Newell Brands is a global consumer marketer selling a number of different product brands from pens to healthcare via retailers. Its common analyst –based peer firms included Procter and Gamble, Kimberley Clark and Colgate Palmolive, which are also global consumer good giants selling brands via retailers. On the contrary, none of these companies are in the same SIC code category with Newell Brands, not even based on the first digit SIC code. Hence, it is reasonable to assume that the method could create economically significant peer groups for studying the diversified firms' value in relation to common analyst –based focused peers, and that this would be an interesting addition to the current literature.

The method is constructed by comparing analysts' actual coverage choices to the coverage choices simulated randomly in a statistical software (1,000 intervals). Hence, the method identifies firms that have more common analysts following them than what would be expected by pure chance. Peer groups generated are year- and firm-specific and as said, independent of standard classification systems. The method is also self-organizing because there is no need to specify the size of the peer groups ex-ante, the method itself creates the limit of how many common analysts are needed for the specific firm-pair not to be classified peers by chance. (Kaustia and Rantala, 2018.) The only decision I had to make was to define the confidence level, which is the probability that the two firms are classified as peers by chance. I used 5% confidence level opposed to 1% used by the authors, because my sample size is significantly smaller. This parameter affects the group size and closeness of the generated peers, but slightly lower confidence level could be accepted to receive enough observations from the simulation.

Kaustia and Rantala (2018) managed to get peer groups for 69% of U.S. based NYSE firms, whereas I got peer groups for 48% of the Nordic listed firms left in my sample in that phase even though I loosened the confidence level a bit. Obviously, the limitation mentioned in the Section 3 that analysts tend to cover typically firms mostly in one geographical area is clearly visible in the simulation results as well, and that definitely limited my resulting sample size also. Still, there were major cross-industry and cross-border peers in the groups in some cases which indicates that the common analyst -method can actually provide new and more accurate peer groups to be used in empirical analysis. For instance, there are strong interrelations in a heavy machinery and industrial cluster between Swedish and Finnish firms, where Swedish firms like Atlas Copco, Alfa Laval and Sandvik and Finnish firms like Metso, Wartsila and Valmet were often peers to each other, even though most of them are in the different two-digit SIC industries. Moreover, for instance Swedish construction company Pandox had altogether eight peers from which five were Swedish, two Norwegian and one Finnish, implying that the cross-border interrelations were followed by analysts also in some industries.

4.2 Method for categorizing diversification strategies

There are two major ways in the literature to define the diversification of the firm: categorical or continuous methods. In the categorical methods the purpose is to classify firms into a pre-specified number of diversification strategy categories, e.g. related, unrelated and focused introduced first

by Wrigley (1970) and followed with his own modifications by Rumelt (1974 & 1982). The continuous methods are measuring the degree of diversification for instance between zero and one, and are typically following a formulas based on segment sales, e.g. Entropy measure and Herfindahl-index used by Jacquemin and Berry (1979). The simplest method is to count the number of business segments firm is reporting and divide firms into the single-segment and multi-segment categories. This count method has been in a wide use in the diversification's firm value effect focused literature (e.g. Berger and Ofek, 1995; Graham, Lemmon and Wolf, 2002; Campa and Kedia, 2002). Another common method used is, direct or some kind of modification of, Rumelt's categorization method (e.g. Lubatkin and Rogers, 1989; De, 1992; Mayer and Whittington, 2003).

I used categorical method preferred by strategic management academics in my study instead of continuous or count based methods more typically used in diversification's firm value effect studies in corporate finance. There are critics and support for every method, and it depends ultimately on researcher's objective which method to choose. For example, Hoskisson, Hitt, Johnson and Moesel (1993) compared the applicability of Rumelt's categorical method, SIC code based count method and continuous Entropy measure, and concluded that Entropy measure and Rumelt's method should lead to the acceptable results. Rumelt's method received also some criticism for its validity from Chatterjee and Blocher (1992). Palepu (1985), in turn, states that continuous index measures are useful because their simplicity, objectivity and replicability while he combines Entropy measure and Rumelt's category in his study. The same qualities are the strengths of a method based on segment counts.

Categorical methods, where strategies are classified by the ratios of the related and dominant segment sales, are naturally more or less semi subjective, because there is no clear rule to follow what operations are actually related to each other. But on the other hand, these methods could provide much more consistent groups when the effect of different diversification strategies and focused strategy is sought after, not just the difference between diversified group and non-diversified group (Pitts and Hopkins, 1982). Furthermore, continuous methods like Entropy measure do not take into account the mode of the diversification, i.e. are the business units related or unrelated to each other and are they vertically or horizontally integrated, it only gives the diversification degree ratio. Thus, Mackey, Barney and Dotson (2017) argue that continuous

diversification measures are good at measuring differences in the degree of diversification, but less effective at comparing diversified strategies with focused ones. Hence, I chose to utilize Rumelt's (1982) categorical method, which I modified slightly to my study.

Figure 2: Rumelt's categorical method for defining diversification strategies

The categorical method Rumelt (1982) published has the following categories for diversification strategies:

Symbol	*Category*	*Ratio specification (% of revenues)*
SB	Single business	$R_s > 0.95$
DV	Dominant vertical	$R_v > 0.70$
DC	Dominant constrained	$0.95 > R_s > 0.70$; $R_c > (R_r + R_s)/2$
DLU	Dominant linked-unrelated	$0.95 > R_s > 0.70$; $R_c < (R_r + R_s)/2$
RC	Related constrained	$R_s < 0.70$; $R_r > 0.70$; $R_c > (R_r + R_s)/2$
RL	Related linked	$R_s < 0.70$; $R_r > 0.70$; $R_c < (R_r + R_s)/2$
UB	Unrelated business	$R_r < 0.70$

Starting with the firm's *specialization ratio*, R_s, it is the share of the revenue coming from the firm's largest single business unit. Business unit is explained to be a product, product line, or set of product lines that share strong market interdependencies. A firm's *vertical ratio*, R_v, is the share of a firm's revenue attributed to its biggest group of products, joint-products, and by-products that are associated with same value chain of processing a raw material into a distributable end product. Then, a firm's *related-core ratio,* R_c, is the fraction of its revenues that can be attributed to its largest set of businesses that share or draw on the same common core competency, skill or resource, or are linked by common market or purpose. Finally, a firm's *related ratio,* R_r, is the fraction of its revenues that can be attributed to its largest set of businesses that are somehow related, meaning that each of the businesses in the group is related to at least one other unit in the group but which does not need exhibit any single common skill or resource. It has to be that $R_s < R_v < R_c < R_r$.

I decided to make some simplifying modifications to the Rumelt's method due to the smaller sample size because I can only compare firms to focused peers in my relative valuation while Rumelt only studied each group's profitability based on accounting measures. This reduced my sample significantly because there were many firms with only peers that were classified as

diversified (e.g. all the Nordic tele operators Telia, Tele2, Telenor, Elisa and DNA are diversified vertically, thus could not be included in the sample as they were the only ones that acted peers to each other). Additional reasons to simplify Rumelt's method were to make the categorization more straightforward and less subjective. Therefore, I used only four separate diversification strategy groups instead of seven presented by Rumelt's method.

Rumelt (1982) states that when making judgements of relatedness of business units, specific attention was paid to the absence or existence of common production facilities, shared selling groups and other tangible evidence of attempts to exploit common factors in the production. Because the operations are nowadays much more technology driven, I will go even further in judging the relatedness and argue that if the business units utilize a common core technology (e.g. expertise in low emission engines), platform (e.g. common online marketplace) or knowledge base (firm-wide expertise in programming or chemistry etc.) they are related even if these aspects are not tangible and clearly visible. Moreover, services are nowadays embedded in majority of the manufacturing companies' businesses, meaning that service and production cannot be separated anymore, and they are in my study considered usually to be one "single-business" categorized under Rumelt's specialization ratio, *Rs,* and under "focused" in my category. One great example of the change in manufacturing firms' business strategy is the Finnish escalator and elevator manufacturer KONE, which draws almost half of its revenues from services provided to installed escalators and elevators as maintenance and renovation services. It means that KONE is getting sales from the same customers during the whole lifetime of the product. Therefore, KONE actually presents only one segment in its reporting, and thus, it is categorized as "focused" in my study.

Figure 3: Modified Rumelt's method to categorize diversification strategies

I classify all the sample firms and the peers every year based on the following method after collecting all the annual segment sales for each firm and their segments:

Category	*Ratio Specification (% of revenues)*
Focused	$R_s > 0.95$
Vertical	$R_v > 0.70$; $R_s < 0.90$
Related	$R_r > 0.70$; $R_s < 0.70$
Unrelated	$R_r < 0.70$

To give a little bit more idea how this semi subjective method was used in my study, I present some example companies for each of the group. As said, I collected the segment sales data manually from companies' annual reports and classified the related ratios based on the business descriptions, strategies and core competencies. In the focused group are the ones that report only one business segment or whose revenue come over 95% from one segment. Moreover, if all functions are otherwise similar but only the end product is slightly different, I have categorized the firms as focused. Good examples of these kind of focused firms are the Danish pharmaceutical firm Novo Nordisk with couple of different medicines in its portfolio, and Norwegian Air which reports two segments with different three-digit SIC industries that can actually be considered the same business (non-scheduled 4522 and scheduled 4512 air transportation). In vertical group, the attention is put to see if the firm is vertically integrated to other parts of the value chain, and that the total revenue from vertically integrated segments is above 70%. If the firm has less than 10% of the revenue coming from e.g. wholesale or retailing in addition to its largest segment, it is still classified to focused group. One example of vertically integrated firm in my sample is the Danish container logistics and transportation company A.P. Moller - Maersk, which provides all sorts of services along the value chain from marine, inland and air freight transportation to terminal and warehousing services.

For related group, my method follows the logic of Rumelt's *related ratio,* so the business units need to be somehow related based on common skill, resource, market or purpose. The largest business segment cannot exceed 70%. Example company for this group is the Finnish pulp and paper firm Stora Enso, which has a number of products from paperboard packaging solutions to wood and paper products. The common resource here being the wood and knowledge how to refine it. Finally, the unrelated group also follows the *related ratio*, but these firms need to have less than 70% revenues attributed to the related segments. Unrelated firms are also all conglomerates holding a portfolio of businesses that are independent and not related to each other. One example in my sample is the Norwegian consumer goods holding company Orkla that has brands for example in food, snacks, confectionery, biscuits, health, personal care, textiles, detergents and painting equipment product categories.

4.3 Methods for the relationship of firm performance and diversification strategy

I measure the firm performance of the different diversification strategies based on relative market value approach and secondly, based on relative operational profitability metric. As already discussed in Section 2, there have been number of ways to measure the firm performance in the prior literature. The ones with most support have been relative "excess market value" methods measuring the excess value, among first used by Montgomery and Wernerfelt (1988) with Tobin's q[3] and Berger and Ofek (1995) with their measure of firm's market value to sum of imputed values for its segments as standalone entities, and followed by numerous others after them. The imputed value calculates intrinsic market values for each segment of a diversified firm based on two-to-four-digit similar SIC code industry single-segment firms. In the strategic management literature, various accounting figure measures, such as return on capital (ROC), return on equity (ROE) and return on sales (ROS), have been used to compare the firm performance.

Even though these accounting measures are quite straightforward to calculate and easy to interpret, they are not fully employing the risk related to the firm's operations. Other shortfall compared to market values is that accounting measures are always backwards looking and subject to managerial discretion. (Lang and Stulz, 1994.) Erickson and Whited (2006), in turn, challenge the use of Tobin's q and argues that the diversification discount arises from the measurement error of Tobin's q in studies using that measure of excess value. Tobin's q is actually hard to estimate and interpret because the "replacement value of assets" is not a figure visible in the markets, and thus is a proxy at the best.

Due to these reasons, I primarily utilize market value based excess value method to compare firm performances and to find out the effect on firm value, and secondly also look into the accounting based profitability. I have to hence assume that markets are efficient and that firm's market value is representing an unbiased estimate of present value of its future cash flows. I cannot use imputed value method (which is impossible due to the common analyst method to define peer groups, it

[3] Tobin's q is the sum of the market values of the firm's equity and debt divided by the replacement cost of its assets. It takes into account intangible assets' effect on market value (Lang and Stulz, 1994).

only gives peers for the whole firm, not for the segments) and decide not to use Tobin's q because of the ambiguity to determine the replacement cost for assets. Thus, I use relative value method based on three value multiples calculated for the peer firms. Then, the median of these multiples is taken and the accounting figure of the study firm is multiplied by that to receive the theoretic intrinsic value of the firm. The natural logarithm of the actual market value of the firm divided by the relative value is taken in order to get the excess value. I use enterprise value[4]-to-assets (EV/assets), enterprise value-to-sales (EV/sales) and enterprise value-to-EBITDA (EV/EBITDA) as relative value multiples, following the multiples used by Berger and Ofek (1995) with the exception that they had EBIT instead of EBITDA. EBITDA is chosen to avoid too many negative values that are more likely to appear when using EBIT.

Secondly, for the accounting based profitability measure, I calculate peer group adjusted EBIT-to-sales (EBIT-margin) ratios in order to find out also the operational performance of the different strategies. Thus, I can better understand the relationship when utilizing both, market and accounting based, measures.

[4] Enterprise value is the sum of the market value of the firm's equity plus preferred equity, minority interest and book value of debt minus cash and cash equivalents, Thomson Reuters Eikon.

Table 2: Descriptive statistics of financial variables

Table 2 presents the means and standard deviations of financial variables by diversification strategy used in pooled OLS regressions. Excess Value-% is the dependent variable in pooled OLS regression for firm value effect, Sales is the figure used to scale the other accounting metrics and together with Assets indicate the absolute size of the firm. EBITDA-%, Capex-% and Leverage-% are the control financial variables used in the regression to isolate the diversification strategies' effect.

Variable		**Focused**	**Vertical**	**Related**	**Unrelated**
Excess Value-%	Mean	0.06	-0.07	-0.26	-0.37
	Std. Dev.	*0.57*	*0.58*	*0.62*	*0.61*
Sales, M€	Mean	1,487	9,121	3,430	5,076
	Std. Dev.	*2,712*	*18,224*	*3,806*	*4,392*
Assets, M€	Mean	2,102	13,445	3,814	5,187
	Std. Dev.	*2,832*	*27,506*	*3,472*	*4,969*
EBITDA-%	Mean	0.30	0.18	0.21	0.13
	Std. Dev.	*0.23*	*0.14*	*0.24*	*0.11*
Capex-%	Mean	0.28	0.10	0.11	0.04
	Std. Dev.	*0.60*	*0.09*	*0.19*	*0.05*
Leverage-%	Mean	0.29	0.27	0.21	0.22
	Std. Dev.	*0.21*	*0.14*	*0.13*	*0.14*
No. of observations		286	105	207	76

Table 2 already shows that focused diversification strategy seems to be the only one that on average gives positive excess value for the sample firms compared to focused peer group, although focused should in theory give close to zero excess value. Interestingly, the magnitude is very large and negative in related and unrelated group since excess values are negative 26% and 37%, respectively. It has to be noted that the standard deviation is also very large in every category, meaning that there is a lot of intra-group variation within the categories. Thus, the small amount of firms in peer groups seems to be causing a lot of volatility in the excess value measure. Secondly, Table 2 also shows that focused strategy has been superior to every other diversification

strategy based on EBITDA-margin, which is 30% on average in focused group. The second best EBITDA-margin mean is in the related diversification strategy, 21%, which is already significantly smaller. What comes to the sizes of the average firms in each category, it makes sense based on the prior literature and based on the rationale to diversify, that vertical and unrelated diversification strategies record the largest sales and assets figures, i.e. these firms tend to own more assets and therefore business segments under management. It is also reasonable that relatedly diversified firms on average utilize some common skills or resources and are smaller than vertically and unrelatedly diversified firms, but still larger than focused firms. Thirdly, it seems that focused firms are superior at investing in growth via fixed assets as well, since the average of 28% of sales is much larger than in any of the diversified categories. This could already imply some underinvestment issues in these categories, since they are also underperforming focused firms' EBITDA-margin as well. The leverage figure is also highest in focused group surprisingly, but when taking into account the standard deviation, the difference does not seem that exceptional. However, this data is contradictory to theory presented by e.g. Berger and Ofek (1995), that the coinsurance effect of diversified firms could lead to higher levels of leverage due to the eased credit constraints when more imperfectly correlated cash-flows are under one management. Lastly, from the descriptive statistics it is already quite safe to assume that the hypothesized inverted curvilinear relationship, i.e. related diversification could outperform every other strategy based on excess value, does not seem probable as related group indicates large negative excess mean value when adjusted for peer group relative value.

4.3.1 Pooled OLS regression for the value effect

After I calculated the average multiples based excess values, I run pooled OLS regression for the panel data because I have cross-sectional and time-variant sample of observations. Pooled OLS panel data regression is chosen over fixed effect and random effects model since it seems to be most suitable one for my data. Fixed effect model cannot be used because it cannot have time-invariant variables or variables with just a little variation annually. My dummy variables that specify the diversification strategies are often time-invariant for the sample firms during 2012-2018, therefore making the model useless. Moreover, when taking the Hausman test for panel model to specify if the random effect model is suitable, the outcome is that the random model is

not consistent with a very low p-value. Thus, I rely on the results of pooled OLS regression in my study.

The dependent variable in the pooled OLS regression is the excess value, i.e. natural logarithm of market value (MV) divided by relative value (RV) from peer multiples. Because I am studying the value effect of diversification strategies using only focused firms as peers, my peer group size is rather low, on average 2.6 peers, after omitting the other strategic categories from the peer groups. This leads to high variation in excess values and especially between the different relative values calculated with different multiples. Hence, in order to reduce variation and to get more robust excess value estimates, I take the average of the three excess values calculated using the three different multiples, and use this average in the pooled OLS regression. I utilize similar kind of controlling variables in my regression than Berger an Ofek (1995) and Lins and Servaes (2002) by including natural log of total assets to control for size, EBITDA-to-sales to control for profitability, capital expenditure-to-sales to control for growth opportunities and debt-to-total assets to control for leverage. The variables of interest are the three dummy variables of "Vertical", "Related" and "Unrelated", each of which is one if the firm is categorized into that diversification strategy group and zero otherwise. The equation used in the regression thus goes as follows:

$$\ln\left(\frac{MV}{RV}\right) = \ln Assets + \frac{EBITDA}{Sales} + \frac{Capex}{Sales} + \frac{Debt}{Assets} + Vertical + Related + Unrelated \quad (1)$$

4.3.2 Pooled OLS regression for the profitability effect

Then, I also wanted to find out whether there are statistical differences between the profitability of the diversification strategy groups when compared to the focused group. Therefore, I need "risk" or "industry adjusted" profitability measures for the firms to see if they are over- or underperforming their own peer group. In my study, the industry is replaced with the common analyst peer group, which I hence use here as well. So, I measure profitability with EBIT-margin, which should be quite consistent and easily available measure of operational performance of firms across industries, taking into account the capital expenditure needs that are not included in EBITDA-margin for example, and excluding one-time items included in net profit figure. I take median of the peer firm EBIT-margins and deduct that from the same ratio of the sample firm in question. Then, I run similar pooled OLS regression with excess EBIT-margin as a dependent

variable and almost the same financial controlling and dummy variables (only EBITDA-margin left out):

$$Excess\ EBIT\% = \ln Assets + \frac{Capex}{Sales} + \frac{Debt}{Assets} + Vertical + Related + Unrelated \quad (2)$$

4.3.2 One-sample t-test and two-sample t-test assuming unequal variances

To further try to find out the real source for the profitability or the value effect, I calculated also common analyst peer group adjusted operational metrics for all of the diversification strategy groups. More specifically, I used EBIT-margin, capital expenditures-to-sales, selling, general & administrative costs-to-sales, salaries-to-sales, research & development costs-to-sales and intangible assets-to-total assets ratios which were chosen based on possible sources for firm performance effects mentioned in the prior literature and discussed in Section 2. EBIT-margin was again used here to compare whether the average profitability margins differ also statistically from the focused strategy group. First, I calculated one-sample t-stats for the averages of all the peer adjusted metrics to find out whether they differ from zero. i.e. are these metrics statistically different from focused peer groups. Thus, the null hypothesis is that the average difference is zero in this test. To further confirm my results, I calculate t-stats to compare if there are statistical differences in EBIT-margins of different averages coming from different diversification strategy and focused groups. Because the variances are very different in magnitude in each of the strategy group, I end up using t-test with unequal variances.

5 Results

5.1 Excess value method

The pooled OLS regression results of the excess firm value on the diversification dummies and financial control variables are shown in the Table 3 below.

Table 3: Pooled OLS regression results for excess firm value measure

The dependent variable is excess firm value calculated by relative value method. Sample firms' year-end assets, sales and EBITDA metrics are multiplied by peer group medians and the average of these three relative values is taken to be used as relative value of the firm. The natural logarithm of year-end actual enterprise value to this computed relative value represents the excess firm value. Then, the excess value is used in regression as a dependent variable. Independent variables are natural logarithm of total assets, Ln assets, EBITDA divided by sales, Ebitda-%, capital expenditures divided by sales, Capital expenditure-%, debt divided by total assets, Leverage, and then the diversification strategy dummies Vertical diversification, Related diversification and Unrelated diversification, which are each one when a firm is categorized to that strategy and zero otherwise. The t-stats of the parameter estimates are shown in the parenthesis.

Variable	Pooled OLS regression
Intercept	0.23*
	(1.72)
Ln assets	-0.05***
	(-2.86)
EBITDA-%	0.34***
	(3.03)
Capital expenditure-%	0.05
	(0.82)
Leverage	0.25*
	(1.83)
Vertical diversification	-0.01
	(-0.20)
Related diversification	-0.22***
	(-3.77)
Unrelated diversification	-0.28***
	(-3.49)
Adjusted R^2	10.40%
No. of observations	674
Note	**p<0.1; **p<0.05; ***p<0.01*

Overall, the regression's adjusted R^2 is 0.1040 indicating that the controlling variables and the diversification strategy could explain only about 10.4% of the excess market values of the sample firms. It is, however, significant based on the p-value and in line with e.g. ones reported by Berger and Ofek (1995) between 2% - 11%. The regression results show that there are altogether five statistically significant explanatory variables, all but debt-to-assets at 1% significance level: ln assets (-0.05), EBITDA-margin (0.34), debt-to-assets (0.25), related (-0.22) and unrelated (-0.28) dummy variables. Thus, regression shows statistically significant negative coefficients for related (t-stat of -3.77) and unrelated (t-stat of -3.486) dummy variables, suggesting that these diversification strategies really have a negative effect on the firm value.

The value loss on average arising from related diversification is hence 22% and from unrelated diversification 28%, meaning that the coefficients can be interpreted to be economically significant as well, i.e. have a meaningful effect on the value. My results are consistent with the corporate finance literature studies made around the 1990s (e.g. Wernerfelf and Montgomery, 1988; Lang and Stulz, 1994; Berger and Ofek, 1995; Lamont and Polk, 2002) but also some studies made later in 2010s (Mazur and Zhang, 2015; Schneider and Spalt, 2016), suggesting that the diversification discount is a prominent phenomenon, both in related and unrelated strategies, leading to a value loss in these corporations. The magnitude of my diversification is, however, larger than reported by these studies, typically ranging between 5 - 15%. It can be that in Nordic countries the effect is existing and stronger, but the magnitude difference is probably due to the high standard deviation in my relative value measures due to the small number of focused peer firms on average.

Some of these prior corporate finance related studies did not separate between related and unrelated diversification, but the ones which took it into a consideration (e.g. Berger and Ofek, 1995; Villalonga, 2004) found also that the diversification discount was typically lower for related diversifiers. The assumption that related diversification can outperform unrelated diversification is supported in my regression output as well, as the difference, 7%, between the two strategy dummy variables is statistically significant. These results, however, contradicts with my hypothesis of inverted curvilinear relationship backed and suggested by e.g. Palich et al. (2000), Campa and Kedia (2002) and Miller (2006). So, these results imply that Nordic publicly listed diversified firms are not good enough at forming strategic assets or utilizing their shared

knowledge and technologies to create a competitive advantage in the markets compared to focused peers.

Negative value effects from related and unrelated diversification were excepted after the overall very negative average excess values in these strategy groups presented in the Section 4 already, but the regression confirms that when all relevant financial measures are controlled for, these diversification strategies are driving the underperformance largely. Moreover, vertical diversification strategy does not have statistically significant effect on excess firm value, although the coefficient has negative but very small value of -0.01 with the t-stat of -0.20. Thus, the value impact of vertical integration strategy cannot be distinguished from zero, i.e. the value impact is not different from focused strategy.

In addition, the results indicate that the firm size measured by total assets has a slightly negative effect on the excess value, consistent with the statistic that diversified firms are larger on average with multiple business segments under management. Then consistent with the intuitive assumption and previous studies (e.g. Berger and Ofek, 1995) that profitability increases firm value, EBITDA-margin has strongly positive coefficient implying that one percent increase in EBITDA-margin increases the excess value by 0.34%. Leverage control variable implies also positive relation to the excess value at 10% level, which is consistent with the value creating impact of interest tax shield also discussed in Section 2. Only Capital expenditure-% investment opportunities control variable does not show statistical relation to the excess value but with a positive coefficient sign.

5.2 Profitability approach

The second object of my thesis was to study the operational performance of the different diversification strategies. So, I calculated the common analyst-based peer group adjusted EBIT-margins to my sample firms and ran a pooled OLS regression using this excess profitability figure as a dependent variable as written in the Equation 2. In the Table 4 below is presented the regression results of this analysis.

Table 4: Pooled OLS regression results for excess profitability measure

The dependent variable is excess EBIT-margin calculated by subtracting the peer group median margin from the sample firm's margin. Variables are natural logarithm of total assets, Ln assets, capital expenditures divided by sales, Capital expenditure-%, debt divided by total assets, Leverage, and then the diversification strategy dummies Vertical diversification, Related diversification and Unrelated diversification, which are one when a firm is representing that strategy and zero otherwise. The t-stats of the parameter estimates are shown in the parenthesis.

Variable	**Pooled OLS regression**
Intercept	-0.05
	(-1.07)
Ln assets	0.01**
	(2.11)
Capital expenditure-%	0.10***
	(5.12)
Leverage	-0.21***
	(-4.60)
Vertical diversification	-0.03
	(-1.21)
Related diversification	-0.07***
	(-3.75)
Unrelated diversification	-0.07***
	(-2.81)
Adjusted R^2	7.74%
No. of observations	674
Note	**p<0.1; **p<0.05; ***p<0.01*

As can be seen, excess EBIT-margin measure gives similar results than excess value method earlier, more specifically related and unrelated dummies are again negative and statistically significant at 1% level while vertical strategy is not statistically different from zero but still with a negative sign. Coefficient for related strategy is -0.07 (t-stat -3.75) and for unrelated is -0.07 (t-stat -2.81), meaning that their negative effect on profitability is on average 7% in both strategies. When looking at the third decimal, the effects are 7.1% and 7.4% for related and unrelated, respectively. This means that the order is in profitability effect the same: vertical diversification is not statistically different from focused strategy, and unrelated diversification is worse than related diversification, although their difference here is not statistically significant, i.e. null hypothesis that the average is the same in these groups holds.

Connecting these results also to the prior literature, they contradict clearly with e.g. Rumelt (1982) and Markides and Williamson (1994) who report improved profitability from economies of scope in related diversification, whereas I show significant negative excess profitability. Indirectly via present value of future cash flows, negative excess profitability for related and unrelated diversification strategies are in line with the value effect reported by e.g. Wernerfelf and Montgomery (1988) and Lamont and Polk (2002).

Regarding the control variables, interestingly some change of coefficient signs happens here: total assets become positive and leverage ratio negative, statistically significant at 5% and 1%, as opposed to the excess value effect regression. The change in leverage ratio could be due to the usage of EBIT-margin, i.e. the tax deductibility of the interest expenses does not affect the EBIT-margin, but can boost the shareholder value still based on free cash flows. Capital expenditure-% have again positive coefficient sign, but this time it becomes also statistically significant at 1% level indicating that investing more in assets create more growth opportunities and thus, possibility for profitability improvements.

The excess profitability regression results confirm the large value losses indicated by excess value regression, because lower profitability due to the diversification should be reflected in market prices of the equities via lower future free cash flows available. This further backs up the assumption that the ability to create economies of scope via strategic assets or common inputs are not existing and thus not leading to a true competitive advantage in diversified firms in Nordics. Moreover, the internal capital markets do not seem to be more efficient than external markets in allocating capital in Nordics. The magnitude of the effect is quite consistent with the value effect presented above for related and unrelated diversification, -22% and -28%. The reason for smaller absolute percentages is that the accounting measure is backward looking and taking into account the yearly profitability effect only, whereas the market value takes into account all the future profits discounted to the present value, therefore the effect is cumulative and seems to be in line. Only major difference is that the performance effect of related and unrelated are much closer to each other in this regression output, i.e. the effect is pretty close to the same on average. The overall R^2 of the regression model was 0.077, meaning that the OLS model can explain around 7.7% of the variation. Therefore, the method is supeior at explaining the variation but is in line with the R^2 results of e.g. Rumelt's (1982) regression model (R^2 around 11%).

Overall, my empirical results from the pooled OLS regressions indicate that the diversification discount exists in the Nordic countries during 2010s, based on firm value and operational performance methods. Moreover, my first and third hypothesis, that related diversification is positively linked to firm excess value and excess profitability, have to be rejected in my sample. Thus, the alternative hypothesis that related diversification, rather than positively, is negatively linked to firm excess value and profitability have to be accepted. Considering the second and fourth hypothesis, that unrelated and vertical strategies are negatively linked to firm excess value and profitability, they can be only partially accepted because vertical diversification does not differ statistically from focused group. However, I can confirm my hypotheses that unrelated diversification is negatively linked to firm excess value and excess profitability.

So, my findings[5] are contradictory to my hypothesis and theory of inverted curvilinear relationship empirically backed by e.g. Rumelt (1982), Palich et al. (2000) Campa and Kedia (2002) and Villalonga (2004) and Miller (2006). My results of negative firm value and profitability effects of related diversification conflict with the positive effects found in this inverted curvilinear theory, but is consistent with the value destroying feature of unrelated diversification after all. However, the results are at the same time consistent with the corporate finance literature studying the diversification's value effect (Lang ans Stulz, 1994; Berger and Ofek, 1995). Furthermore, e.g. Rumelt (1982) reported also negative excess profitability for vertical diversifiers, which I cannot statistically conclude in my study.

The interpretation of my regression results are however subject to some doubt on the sufficiency of my peer group data points, i.e. some of my peers have larger impact on the sample firms' performance effects than others when there are only one or two peers in the group. This may lead to some performance bias and have to be noted when interpreting the economic indications

[5] I conducted also regressions for geographical sub-segments of Finland, Sweden, Norway and Denmark. The results were not significant, mainly due to the low amount of observations in some of the categories.

5.3 Theoretical justification of the results

Since my regression results point towards significant negative effect arising from diversification, I next try to explain the sources for the diversification discount and connect my results to existing theories for value loss and worse operational performance mentioned in the prior literature and discussed in the Section 2.4 earlier.

So, some possible theories for the negative effect on firm performance discussed earlier were e.g. increased coordination and administration costs, overinvestment, cross-subsidization, agency problems and information asymmetries. Agency problems and information asymmetries could lead to inefficient allocation of capital which could mean underinvestment discussed by Stulz (1990) in general (e.g. risk aversion of managers) or worse profitability due to the investments in lower or negative NPV projects, also assumed in cross-subsidization. Jones and Hill (1988) and La Rocca et al. (2018) for instance discuss this based on transaction costs perspective. They suggest that inefficient intrafirm transactions, costs from agency issues and coordination costs among business segments in addition to distorted incentives and lack of cooperation of divisional managers represent the reasons for benefits of diversification to be outweighed by the negative effects of diversification.

Hence, I calculated common analyst based peer group adjusted operational metrics for my sample firms. More specifically I used excess EBIT-margin to find out if there are implications of ineffective capital allocation to project by internal capital markets, capex-to-sales to see if the diversified firms overinvest, selling, general & administration costs-to-sales to find out if there is signs of increased coordination costs and total salaries paid-to-sales to see if the increased salaries could imply the rent-seeking behavior of divisions and thus, distorted incentives of divisional managers. I also calculated research and development costs-to-sales and intangible assets-to-total assets just to see if there are signs of positive effect of diversification. Below in the Table 5 are the peer adjusted averages for each diversification strategy group and for each accounting based operational metric with one-sample t-stats presented in the parenthesis.

Table 5: Peer group adjusted average accounting measures by diversification strategy group

Table 5 presents the mean accounting measures of different diversification strategies, adjusted by focused peer group median, i.e. the yearly peer group median figure is deducted from sample firm's every yearly figure, and the average of all the firm-year observations is taken in each diversification category. EBIT, Capital Expenditures, Selling, General & Administration Costs, Total Salaries Paid and R&D Costs are scaled by firm's sales to make them comparable, Intangible Assets are scaled by total assets. One-sample t-test is conducted for each metric in each category to find out whether they differ from zero, i.e. from focused peer group. The t-stats of the averages are shown in the parenthesis.

Variable	Focused	Vertical	Related	Unrelated
EBIT-%	-0.006	-0.018	-0.054***	-0.060**
	-(0.41)	-(0.99)	-(5.79)	-(2.25)
Capital Expenditure-%	0.020	-0.110***	-0.021	-0.041***
	(1.02)	-(4.22)	-(1.41)	-(3.00)
SG&A-%	0.012	0.026*	-0.002	0.037**
	(1.21)	(1.93)	-(0.22)	(2.01)
Total salaries-%	0.010	0.044***	-0.024**	0.020
	(0.89)	(4.38)	-(2.53)	(1.43)
R&D-%	0.020	-0.053**	-0.026***	-0.003
	(0.92)	-(2.62)	-(3.12)	-(0.81)
Intangible assets-%	0.018	-0.017***	0.024**	-0.004
	(1.47)	-(2.65)	(2.43)	-(0.34)
No. of observations	286	105	207	76

Note **p<0.1; **p<0.05; ***p<0.01*

In the Table 5 the results vary quite a lot depending on the diversification strategy in question. Starting with the focused strategy group, all of the metrics are statistically insignificant from zero, which is the assumption of course because they are compared against focused peers, i.e. peers with similar strategy. Then, in vertical strategy group, we can see again that the EBIT-margin is not

significantly different from zero, even though it has a negative excess average of 1.8%. But it seems that vertical diversifiers invest much less compared to focused peers, because the average excess capital expenditure-ratio is -11.0% at 1% significance level implying underinvestment and possibly a risk aversion of managers. Vertical group has also significantly higher excess SG&A (2.6% at 10% level) and salary costs (4.4% at 1% level). It seems though that some transaction economies also suggested by D'aveni and Ravenscraft (1994) exist between vertical units in addition to 5.3% (at 5% level) lower R&D costs, and that these are evening out the higher personnel and SG&A costs. This is consistent with the insignificant value and profitability effects found in regression before.

Continuing with the related diversification strategy, the average excess EBIT-margin is -5.4% and significant at 1% level. Interestingly though, both excess SG&A (-0.2%) and personnel costs (-2.4%) have negative averages, personnel costs at 5% significance level meaning that the underperformance is not driven by rent-seeking behavior via higher salaries or increased coordination costs. Moreover, either overinvestment or serious underinvestment do not seem to be the problems, as the excess capital expenditure average is -2.1% but not significant. There is also evidence backing up the theory by Miller (2006) that relatedly diversified firms could enjoy lower R&D costs (-2.6% at 1% level) and higher share of intangible assets (2.4% at 5% level) due to the broad applicability of the technologies inside the corporate.

Therefore, it seems that the worse profitability compared to focused peers comes from worse gross margin, i.e. from lower NPV projects, not from the personnel, coordination costs or over-/underinvestment. The explanation for this could be cross-subsidization where the internal capital allocation is inefficient and underperforming divisions get more funding for their lower NPV projects than what is optimal for the firm, lowering the profitability. This could be a consequence of internal power struggles and information asymmetries. The results here are also consistent with the negative firm value and profitability effects reported earlier, and thus lower profitability is leading the firms to trade at discount.

Finally, the unrelated diversification strategy also presents a negative average excess EBIT-margin of -6.0% at 5% significance level. Further, looking at the other metrics, it seems that underinvestment and higher SG&A costs (3.7% at 5% level) arising possibly from increased

coordination and administration drives the decreased profitability. Excess capital expenditure average (-4.1 at 1% level) implies a serious underinvestment issue possibly due to the managerial empire building, i.e. agency problems. Personnel costs and R&D costs do not differ statistically from peer group average. Thus, there seem to be rational reasons to value undiversified corporates at discount also due to their lack of growth investments and increased coordination costs.

To connect these results with the prior studies, it seems clear that overinvestment suggested by Berger and Ofek (1995) and Schneider and Spalt (2016), cannot drive my results, since all of the diversifying strategies give negative average excess values for capital expenditure- ratio implying that rather underinvestment problem is driving the underperformance. I find evidence in related diversification group backing up the theories of inefficient internal capital markets or cross-subsidization (e.g. Stulz, 1990; Myers et al., 1992; Berger and Ofek, 1995) and possible information asymmetry costs between the business units based on poorer EBIT-margin (Myerson, 1982). Unrelated group indicate also poorer EBIT-margin suggesting that the internal capital markets are not efficient there either, but that also the theory of higher coordination and governance costs (Jones and Hill, 1988) based on excess SG&A costs and lack of growth investments are significant drivers there. The coordination cost explanation and underinvestment problems are also present in the vertical group. In addition, consistent with Schoar (2002), salary costs are on average higher in vertical group, suggesting existing agency problems (Scharfstein and Stein 2000; Rajan et al., 2000).

Lastly, I compared the sample means of focused strategy group to diversified strategies in excess EBIT-margin measure with the two-sample t-test assuming unequal variances (two-tail test) to further find confirmation for the worse operational performance of diversified firms in my sample. Overall, I can conclude that the negative average peer adjusted EBIT-margins in related and unrelated groups are statistically different from the average in focused group, related with -4.7 percentage points mean difference at 1% significance level, and unrelated with -5.3 percentage points mean difference at 10% significance level. Thus, it seems that the worse profitability in these diversification strategy groups is quite robust throughot. Again, in the vertical group, the -1.2 percentage points mean difference ended up not being significant.

6 Conclusion

The purpose of this thesis was to bring new evidence on the disputed field of reseacrhs in corporate diversification strategies' relationship to firm performance. Even though the subject is vastly studied, there is not existing a theory that is widely accepted to be ultimately the truth based on strong empirical backing. I approached the subject from a novel angle, and challenged the conventional methods used in defining peer firms for excess value and profitability measures to be used in empirical analyses. I utilized a common analyst –method created by Kaustia and Rantala (2018) to define focused peer firms in my study. I also used publicly listed firms from only Nordic countries excluding Iceland to add on to the geographical distribution of the research as well.

I categorized firms into a four different diversification strategies: vertical, related and unrelated in addition to focused firms. I utilized modified Rumelt's (1982) categorization method in defining the strategy groups for my sample firms. My empirical results indicate that there seems to be a diversification discount assigned for Nordic companies in 2010s based on the excess value method and when controlling for the basic financial variables. The magnitude of a value loss is 22% for related diversification strategy and 28% for unrelated diversification strategy, when compared to the focused peer group. The vertical strategy does not generate excess value different from zero. These results differ from the inverted curvilinear assumption I made, and which has been one of the most discussed and backed theories among academics especially after late 1990s (e.g. Campa and Kedia, 2002). The results are, however, in line with the negative value effects arising from all diversification implied by studies made in 1990s by e.g. Berger and Ofek (1995).

Furthermore, I studied the diversification strategies' effect on operational profitability as well with excess EBIT-margin as a dependent variable. This study confirmed the excess value regression results, that related and unrelated diversifiers destroy value via negative excess profitability, which was -7% on average for both groups. Vertical strategy again was not statistically different from focused peers, although with a negative coefficient sign. So, the ultimate answer to my research question is that related and unrelated diversification have a negative effect on firm value, and that value effect comes via worse profitability. Therefore, despite the technological development and structural changes in manufacturing and service business models, the focused strategy has been the best for the shareholder wealth in the Nordics after 2012.

I also studied the sources for the profitability effect, and thus also what drives the diversification discount in my data. The conclusion is that internal capital markets created via diversification do not seem to be very efficient at allocating capital to most profitable projects in the corporations when compared to focused peers that can be more transparently monitored by external capital markets.

I have to also point out that my study suffers from some data sufficiency limitations that affected the results and have to be noted when interpreting the economical practicality of my conclusions. Because the average size of the peer group in the excess value calculations was only 2.6, the variation in these measures were large. Therefore, the magnitude of the diversification discount was also clearly higher than what it has been typically in the prior value effect studies. I can still indicate from my results that these strategies seem to be underperforming the focused strtategy.

For the further research, I suggest to continue challenging the methods used and perhaps combine common analyst –method with various others, e.g. continuous Entropy-method and SIC code based imputed value method to be able to bring more robustness and to more specifically assign the results for the actual issue or to the methods used. Since the share of the insider owners was a major driver for German diversified firms not to have a diversification discount (Lins and Servaes, 2002), I would also suggest to include insider ownership to the analysis to see whether that changes the results in Nordics.

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